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The 9 Things That Affect CPU Performance

When it comes to CPU performance, there are many factors at play.

BY [RAZVAN MIHAILA](#) PUBLISHED NOV 15, 2022

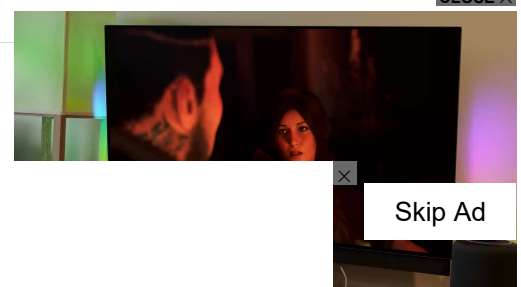


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Are you looking for a new processor? Or did you notice your computer processor performance constantly varying? But what are the factors influencing these variations?

The truth is that external factors, such as temperature, and internal factors, such as clock speed, cache size, or bandwidth, affect a processor's performance. But how much does each one of these factors matter? To find out, we'll take a closer look at every one of them

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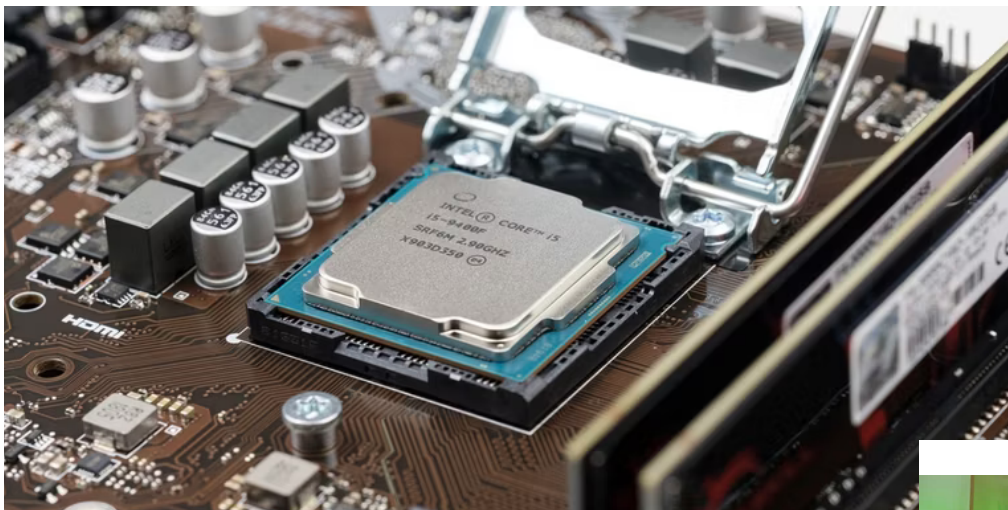
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1. Cores Number

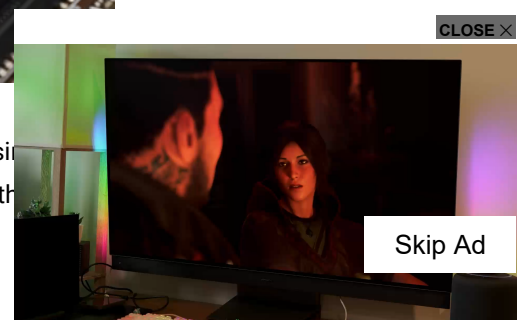
CPUs have processing units known as cores. Every core is designed to fetch, read, and execute instructions. So, the more cores a processor has, the greater the number of instructions it can process.

Every program that runs on your computer has a string of data known as a thread. A single-core processor can process a single data thread at a time, so the processor will switch between multiple threads to keep the processes running.

This is why manufacturers developed multicore processors, such as "dual-core" or "quad-core." Having more than one core allows your computer to manage multiple threads simultaneously, increasing the overall performance.



However, increasing the number of cores doesn't increase the computer's processing power by a proportionate measure. Processor cores are permanently communicating with each other, thus using some added processing power.



2. Clock Speed

The processor's clock speed, or clock rate, shows how fast the CPU can run. Usually, the clock speed is expressed in GHz and reveals the number of instruction cycles the processor can run in a second. For example, a 4.2GHz processor is capable of running 4.2 billion cycles a second.

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Of course, the higher the clock speed, the bigger the number of cycles a processor can run in a second. CPU clock speed can be improved through a process known as overclocking.

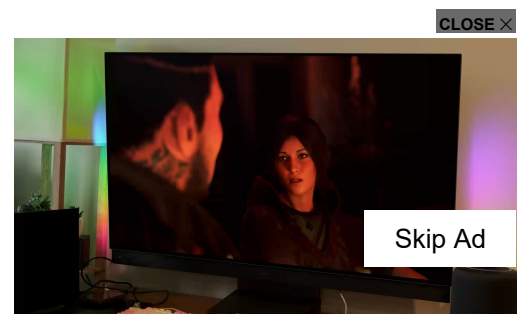
If you aren't satisfied with your processor's clock speed, you can [overclock your PC CPU for faster performance](#), but you should keep in mind overclocking's downsides.

3. Clock Cycle

The clock cycle, or clock tick, is the period between two electrical impulses inside a processor. Every pulse represents a signal to the CPU to perform a certain task. Older CPUs were designed to perform a single task per clock cycle, unlike modern CPUs, which are capable of processing multiple tasks during the same clock cycle.

Stack of processors

So, a processor with a high clock cycle will perform faster, as it can execute more instructions during the same cycle.



4. Cache Size

Every processor has built-in high-speed memory, known as a cache. The processor uses cache memory to store instructions and data that it might need again temporarily.

A larger cache size will improve processor performance, as it doesn't need much time to retrieve the temporarily stored information.

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5. Bandwidth

The bandwidth represents the rate at which the processor can fetch or store data within the computer's memory. Most of the time, the memory bandwidth is expressed in bytes/second. So, the bigger the processor's bandwidth, the faster it can read and write data.

6. Word Length

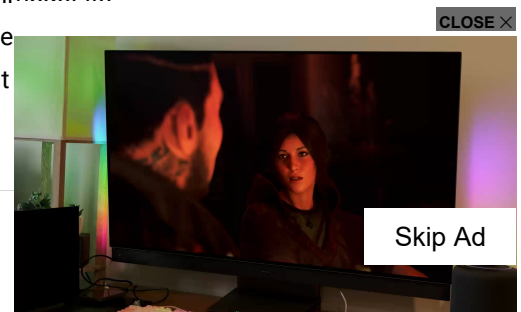
Word length, also known as word size, refers to how much data the processor can handle at one time. A processor's word length regulates a bit pattern size that can be fetched in a single operation.

So, the more bits the processor can work within a single cycle, the greater its processing speed will be. Older CPUs can handle a 32-bit word at once, while modern CPUs are designed to fetch a 64-bit word in one pass.

7. Extreme Temperatures

The most common threat to your processor is overheating. As the processor gets assigned more tasks, it keeps getting hotter. Operating at high temperatures will negatively impact its performance, and it might even shorten its lifespan. If the processor overheats, the motherboard temperature sensor will instruct the CPU to slow down or even turn it off to protect it.

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Modern processors can operate normally up to 176 degrees Fahrenheit (80 degrees Celsius), with some of Intel and AMD's latest CPUs even hitting 194F/90C, so you'll notice if your computer gets hot before the processor suffers irreversible damage. However, if you want to make sure your processor isn't heating up too much, you can [check the CPU temperature](#).

If your CPU temperature constantly exceeds 158 degrees Fahrenheit (or 70 degrees Celsius), you should get a powerful cooler or a well-ventilated chassis.

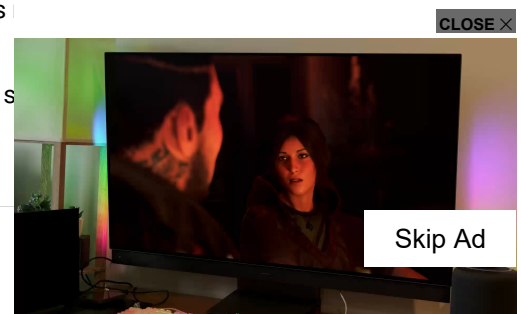
Computer fan

The same goes for cold temperatures. If you store your computer in a very cold room, your processor might get damaged as it heats up. The electricity running through its circuits will heat up its components and might cause internal condensation or make the cores expand and distort them.

8. Processor Materials

If you are a perfectionist, you'll think about processor materials when looking for your next CPU. Different producers use different materials for their products, and the results vary. Every processor element, including the materials, will influence its overall performance. Not-so-good materials might cause the processor to overheat, thus slowing it down.

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When it comes to processors, the slowest component will have an impact on the entire CPU behavior.

9. Number of Running Apps

The truth is, no matter how new or expensive your processor is, its performance will decrease if you give it too many tasks to deal with. If you constantly have a lot of high-resource applications running on your computer, you may notice your computer starting to move a bit slower.

Multitasking slows down processors as they distribute their resources among more running tasks. So, whenever possible, close any apps that you don't need anymore. Also, it helps if you don't keep your computer turned on permanently.

What to Look For in a Processor? Now You Know!

Hopefully, now you have a better idea of the factors that influence your processor performance. While there's not much that you can change, except for getting a new processor, you can upgrade your cooling system and close some of the unnecessary apps.

Now, if you want to improve your computer performance, there's more to pay attention to than just your CPU performance.



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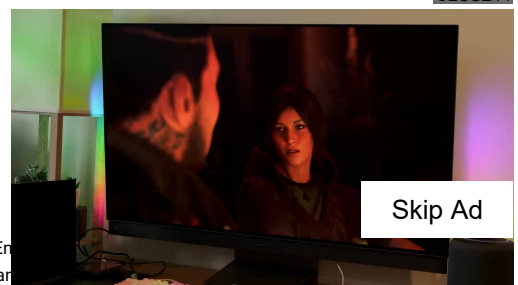
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Razvan has always been passionate about technology, which led him to graduate with a Bachelor's degree in Engineering. Having left the corporate world, he joined the MUO team in 2021. Now, he focuses on troubleshooting guides and

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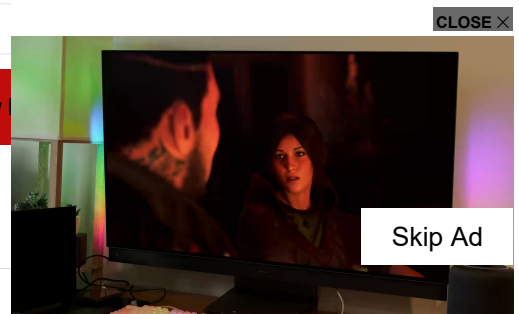
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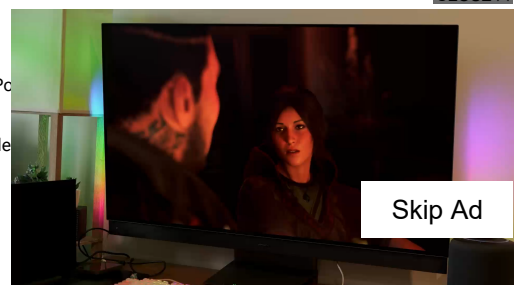
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